



Search tips

All of Design News

Go!

roductDesign

Home | Reply Online | Webcasts | Search Engineer | 💆 SpecSearch® | Newsletters | About Us | 🤇

Find a Supplier Click here to search by company or product

Technologies

Metals Motion Control/

Power

Markets

Consumer

Electronics

CAD/CAM/CAE

Electronics/Test

Automation

Plastics/Nonmetals

Transmission

Aerospace/Defense

Auto/Off-Highway Computers/Office

Machine Tools

Medical/Healthcare Pkg/Process Equip.

Semiconductor Mfg.

Telecommunications **New Products**

Ind. Controls/

Fastening/Joining Fluid Power

Free print subscription 🕻 to Design News

Email this story to a friend 🔯



New membranes boost PEM performance

By Staff Design News

June 22, 1998

The performance of PEM fuel cells is highly dependent upon the proton exchange membrane used. Several fuel cell manufacturers, such as Ballard Power Systems, already produce the membrane materials found in their cells. But some recent work by several researchers has yielded materials with potentially superior properties to those used today.



Not surprisingly, one of a membrane material's most important properties is high protonic conductivity. Early membranes, such as those used in the Gemini space missions, consisted of sulfonated, crosslinked polystyrenes. More recently, interest has turned to sulfonated fluorocarbon polymers, of which DuPont's NAFION(TM) is probably the most popular. This material exhibits protonic conductivity greater than 0.07S/cm.



Recently, work by engineers at Rensselaer Polytechnic Institute (Troy, NY) under grant from Dais Corporation, has resulted in a new membrane material that exhibits the desirable properties of high conductivity and relatively low cost. It's called Dais 585 ionomer, and the core material is a sulfonated styrene/ethylene-butylene/styrene tri-block copolymer, a family which includes such familiar products as Shell Chemical's Kraton(copyright) elastomer.

The end product is said to be an elastic, hydrocarbon based hydrogel with cation exchange ability, good optical transparency, and ion conductivity of 0.09S/cm--roughly 15% higher than competitive materials at 40% lower cost, the company claims.

So far, Dais has incorporated the material into its PowerCell fuel cell products ranging in output from 8 to 100W, and is constructing production-ready prototypes reaching 1 kW.

Another membrane material is being developed by Giner, Inc. (Waltham, MA) for use with the direct methanol liquid feed fuel cell (DMLFFC) invented by researchers at USC and JPL. A drawback of this fuel cell design is that methanol permeates currently available PEMs and passes from the anode to the cathode, resulting in parasitic methanol loss and reduced cell voltage.

To address these issues, Giner patented a composite membrane which has been credited with reducing methanol transmission from 40% to 15% while maintaining high ion conductivity. This project was funded in part by an Army SBIR, and the military is expected to be an early adopter of the DMLFFC.

"The industry has begun bringing engineers in and taking fuel cells from the realm of electrochemists," says Rhett Ross. "Engineers are applying basic engineering techniques to make the materials better."

Registration

Search

Edit your individual information, change your e-mail address, or add/cancel e-letter subscriptions.

Update

Archives

Design News Global Design News PD&D

Career Center DN Classified

Job Links Learning Center

Technology Reports

Reader Services Design News PD&D

eCards

eLit

Editorial Calendar

Design News PD&D

Ultimate Engineer Challenge

Gadget Freak

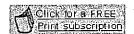
Contests/Awards

Take A Break

Supplements

Subscription Services

Design News PD&D



© 2003, Reed Business Information, a division of Reed Elsevier Inc. All Rights Reserved.

Free print subscription iguplus

to Design News

Print-friendly version



Email this story to a friend



WMS for 3PL Warehousing Automate you calculations S managed inve options

Outsource Warehousing Warehousing Distribution Se Within 500 mil of U.S. pop



home | about us | your account | contact us | free subscription | ad info | help

Design News + Product Design and Development

© 2003 Reed Business Information, a division of Reed Elsevier Inc. All rights reserved. Use of this Web site is subject to its Terms of Use Privacy Policy